

In The Claims

Please amend the claims as follows:

1. (currently amended) An apparatus for measuring at least one parameter of a process flow flowing within a pipe, the apparatus comprising:

at least two ~~pressure-strain~~ sensors attached ~~clamped-onto~~ the outer surface of the pipe at different axial locations along the pipe, each of the ~~pressure-strain~~ sensors providing a respective ~~pressure-strain~~ signal indicative of a pressure disturbance within the pipe at a corresponding axial position, each of the ~~pressure-strain~~ sensors comprising a piezoelectric film material having a pair of conductors disposed on opposing surfaces thereof; sensor; ~~whereby the piezoelectric film is attached to the outer surface of the pipe; and~~

a signal processor, responsive to said strain ~~pressure~~-signals, which provides a signal indicative of at least one parameter of the process flow flowing within the pipe.

2. (canceled)

3. (original) The apparatus of claim 1, wherein the process flow is one of a single phase fluid and a multi-phase mixture.

4. (canceled)

5. (canceled)

6. (canceled)

7. (canceled)

8. (canceled)

9. (currently amended) The apparatus of claim 1, wherein the piezoelectric film material ~~sensor~~ includes at least one of polyvinylchlorine fluoride (PDVF), polymer film and flexible PZT.

10. (canceled)

11. (currently amended) The apparatus of claim 1, ~~10,~~ wherein each of the pairs of the pair of conductors is a coating of silver ink.

12. (currently amended) The apparatus of claim 1, wherein the piezoelectric film material extends around a substantial portion of the circumference of the pipe.

13. (currently amended) The apparatus of claim 1, wherein the piezoelectric film material has a thickness greater than 8 mm.

14. (currently amended) The apparatus of claim 1, wherein the piezoelectric film material has a thickness between 8 mm and 120 mm.

15. (currently amended) The apparatus of claim 1, further includes an electrical insulator between the piezoelectric film material and the pipe strap.

16. (currently amended) The apparatus of claim 1, wherein the ~~pressure-strain~~ signals are indication of acoustic pressures propagating within the pipe.

17. (original) The apparatus of claim 1, wherein the parameter of the fluid is one of steam quality or “wetness”, vapor/mass ratio, liquid/solid ratio, volumetric flow rate, mass flow rate, size of suspended particles, density, gas volume fraction, and enthalpy of the flow.

18. (original) The apparatus of claim 1, wherein the signal processor determines the slope of an acoustic ridge in the k-w plane to determine a parameter of the process flow flowing in the pipe.

19. (currently amended) The apparatus of claim 1, wherein the ~~pressure-strain~~ signals are indication of vortical disturbances within the fluid flow.

20. (original) The apparatus of claim 19, wherein the parameter of the fluid is one of velocity of the process flow and the volumetric flow of the process fluid.

21. (original) The apparatus of claim 1, wherein the signal processor determines the slope of a convective ridge in the k-w plane to determine the velocity of the fluid flowing in the pipe.

22. (original) The apparatus of claim 1, wherein the signal processor determines the volumetric flow rate of the fluid flowing in the pipe in response to the velocity of the fluid.

23. (currently amended) The apparatus of claim 1, wherein the signal processor generates a flow velocity signal indicative of the velocity of the fluid flowing within the pipe by cross-correlating the ~~pressure-strain~~ signals.

24. (original) The apparatus of claim 1 wherein each sensor measures an acoustic pressure and provides a signal indicative of an acoustic noise within the pipe.

25. (currently amended) The apparatus of claim 1 further comprising at least three of said ~~pressure-strain~~ sensors.

26. (canceled)

27. (currently amended) The apparatus of claim ~~1, 26,~~ wherein the ~~pressure-strain~~ sensors are mounted to the outer surface of the pipe by an adhesive.

28. (new) The apparatus of claim 1, wherein the strain sensors include pressure sensors.